Final Demo Details and Scoring

ECE 2031 Spring 2016 Design Project

Object Detection and Mapping

Demo Details

- The goal of the project is to have a DE2Bot find objects placed within an arena, report how many are present, and transmit their coordinates.
- The arena is approx. 8’ x 10’, with 2’ gaps in the center of the long sides.
  - Arena is divided in to a grid of 2’ squares.
- Objects are cylinders or cubes.
  - Will be placed approx. in the center of grid squares.
  - Cubes will be aligned with the grid.
- Robot will perform three 60-second runs.
  - Each run will have a different number and arrangement of 3-6 objects.

Demo Rules

- Robot must start outside the arena.
- Runs will last a maximum of 60 seconds.
  - Run time starts when robot is “activated”, generally by flipping SW17 and pushing a button.
- Object coordinates must be sent as “X__Y__”.*
  - Where “__” is two hex digits (i.e. one byte).
- Object count must be sent as “N__”.*
- Run time stops when object count is reported.
  - So if done, that must be done last. No coordinates will be accepted after reporting the count.

* Robot code to properly transmit coordinates and count is provided.

Demo Score and Demo Grade

- These slides describe the process of assigning a *raw score* to your project demonstration.
- The raw scores from all teams in all sections will be normalized to a 500-point demo *grade*.
- The highest raw score will earn 500.
- The lowest score will *not* get a 0, even if it itself is 0 (or negative).
  - Low score will likely be mid-C (360-390), based on performance.
  - Complete failure to function could lower that scale.

Scoring Basics

- Positive points are awarded for:
  - Reporting the correct number of objects.
  - Reporting the correct coordinates of objects.
  - Time remaining after sending object count.
- Negative points will result from:
  - Colliding with the arena, or objects outside the arena.
  - Colliding with objects inside the arena.
- Each run produces a single numerical value
  - Team score is the sum of all three runs

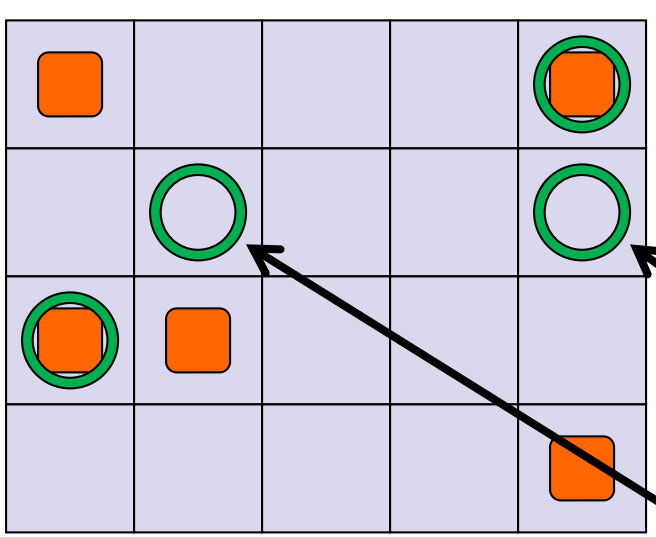
Positive Scoring Details

- Correctly reporting an object's coordinates is worth 200 points.
  - Misreporting a side-adjacent coordinate is worth 30, and diagonally-adjacent is worth 15 (examples to follow)
  - With N objects, only the first N reports will be scored.
  - Each object will only contribute points once.
- Correctly counting the number of objects is worth 500 points.
  - Undercounting by 1 results in 250 points
  - Overcounting by 1 results in 150 points
- Each second remaining after reporting the count is worth 1 point.
  - Even if the count is wrong.
  - An immediate guess will earn 60 points for time, but will not earn the normal 150/250/500 points.

Negative Scoring Details

- Each collision with arena walls or objects outside the arena results in a 50-point penalty.
  - Brief sliding along a wall, or a few taps while rotating near a wall, will be counted as one collision.
  - Prolonged sliding, or obvious re-colliding in the same place, will be counted multiple times.
- Each collision with an arena object results in a 25-point penalty.
  - Same multiple-hit rules as above.
  - Pushing an object far enough to reach the edge of its grid will be counted as two hits.
  - Pushing an object outside its grid will count as three hits, and does not change the object's coordinate for scoring purposes.

Scoring Example 1



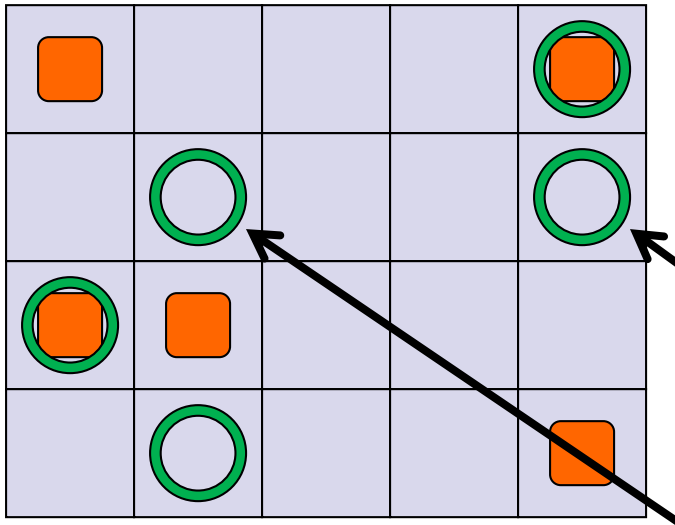
Object

Reported coordinate

No points, because all adjacent objects have already contributed points.

Since this could be counted as 30 or 15, it would earn 30.

Scoring Example 2



Object

Reported coordinate

No points, because all adjacent objects have already contributed points.

This would now be counted as 15 so that the one below could be counted as 30.

Disclaimer

- Every effort was made to be true to the original project description
- Consideration has been made to what teams seem to be capable of achieving
- If scoring modifications are deemed to be necessary, they will be announced
  - To plug loopholes in the rules
  - To fix typos
  - To satisfy a legitimate and widespread concern of students